CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME II

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ISOLATION AND IDENTIFICATION OF FERULIC ACID FROM RICE BRAN

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ABSTRACT

Rice bran is one of the most abundant by-products produced in the rice-milling industry but has been much underutilized and thus end up as animal feed or dumped in landfills. On the other hand, it is a good source for obtaining bioactive phenolic compounds such as ferulic acid. Ferulic acid has antioxidant properties that make it an important anti-aging supplement as well as having other potential uses. This study aims at optimizing the incubation parameters for rice bran with feruloyl esterase A releasing (FAE-III) *Aspergillus niger* (ATCC 9029) which leads to the highest amount of ferulic acid. The statistical experimental design and the analysis of the data were conducted using STATISTICA® software. Half factorial design was employed with three factors which are incubation period, temperature and inoculum size. Ferulic acid was extracted from the incubated mixture using chloroform and methanol in the ratio of 2:1. Free ferulic acid was removed by adding 70% ethanol. Analysis of ferulic acid was carried out by HPLC. Results showed that a maximum amount of ferulic acid of 0.562 mg per gram rice bran was produced at 24 hour, 32°C using 1.5mL of inoculum size of $1x10^8$ spores/mL. Production of ferulic acid is an attempt to exploit the potential of rice bran as well as value adding the rice industry which can benefit the farmers and the nation.

Keywords: ferulic acid, *Aspergillus niger*, feruloyl esterase A (FEA III), solid state fermentation, HPLC

INTRODUCTION

Rice *(Oryza sativa L.)* is currently one of the main sources of food sustenance for over half of the world's population. During the rice milling process, various rice by-products are generated most of which are usually discarded as waste. Studies have proven that for every one hundred kilogram of paddy rice, as much as 18 – 20 kilogram of rice bran will be generated (Schalbroeck, 2001). Malaysia produces 1.45 million tons of rice per year (USDA, 2005) which is equivalent to the production of 250,000 tons of rice bran. Rice bran is one of the most abundant by-products produced in the rice-milling industry but has been much underutilized. More than 60 million metric tons of rice bran each year ends up as animal feed or dumped in landfills.